

Appl. No. 10/607,778  
Amdt. Dated Oct. 6, 2004  
Reply to Office Action of Sep. 9, 2004

### **REMARKS**

#### ***Claim Rejections under 35 U.S.C. 103(a)***

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dai et al. (USP 6734826 B1). Applicants respectfully traverse the rejection due to the following reasons.

Regarding amended claim 1, a multi-band antenna comprises an insulative substrate having a major surface, a coaxial cable and a conductive element formed on the major surface of the insulative substrate. The conductive element comprises a first part and a second part, **the first and the second parts being disconnected with each other** by a non-conductive gap.

Dai et al. discloses an antenna comprising a substrate 30, a coaxial cable 40 and a conductive element (not labeled). The conductive element comprises a radiating portion 21 (stated first part) and a ground portion 10 (stated second part). **The radiating portion 21 and the ground portion 10 are connected with each other by a first and a second connecting portions 22, 23** (Lines 53-57, Col. 2). The radiating portion 21 and the ground portion 10 are spaced from each other at only one end adjacent to the coaxial cable 40, while they are connected with each other at the other end away from the coaxial cable 40. Considering the invention of Dai et al. as a whole, the integral relationship between the radiating portion 21 and the ground portion 10 are in connection, rather than disconnection.

The antenna of Dai et al. is a conventional inverted-F antenna. As well known, a conventional inverted-F antenna comprises a radiating portion, a ground portion and a connecting portion connecting the radiating portion and the ground portion. Such examples can refer to USP 6,473,042, USP 6,633,261, USP 6,600,448, USP 6,147,652, and so on. Referring to FIG. 2 and Lines 49-52, Col. 2 of USP 6,473,042, the grounding leg 70 functions as a connecting portion which grounding

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the radiating plate 7 to the grounding plate 4. Referring to FIG. 1 of USP 6,633,261, the metal lead 14 functions as a connecting portion grounding the conductive plate (stated radiating portion) 12 to the base plate 11 (stated grounding portion). Referring to FIG. 6 of USP 6,600,448, there is still a connecting portion (not labeled) between the radiating element portion 3 and the ground portion 4. Referring to FIG. 1 and Lines 14-16, Col. 4 of USP 6,147, 652, the short-circuited line 101a functions as a connecting portion connecting the antenna 101 to the conductor plate 102. From the above, the applicants conclude that for a conventional PIFA antenna, the connecting portion which is used for grounding the radiating portion to the grounding portion is essential in the art.

Compared with the conventional PIFAs, the structure of the antenna according to the present invention is much simpler. One has ordinary skills in the art can **NOT** obtain the antenna without connecting portion as claimed in the present application through modifying Dai et al's antenna with the first and the second connecting portions 22, 23.

Therefore, claim 1 is believed to be patentable over Dai et al.

Claims 2-5 are also believed to be patentable since they at least dependent from independent claim 1.

The independent claim 6 defines an antenna comprising a first conductive patch operating at a first frequency band, a second conductive patch operating at a second frequency band and substantially **partially surrounding** the first conductive patch, and a feeder line, wherein **when the first conductive patch operates in the first frequency band, the second conductive patch functions as a grounding portion for the first conductive patch, when the second conductive patch operates in the second frequency band, the first conductive patch functions as a grounding portion for the second conductive patch.**

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Referring Lines 11-18, Col. 3 of Dai et al., the antenna comprises a feeder cable 40, radiating segments 211-214 operating at a first (higher) frequency band and radiating segments 211-218 operating at a second (lower) frequency band. When a lower-frequency-band signal is fed through the feeder cable 40, the radiating segments 211-218 will resonate at a lower frequency band with respect to the ground portion 10. In other words, when the radiating segments 211-218 operate in a second frequency band, the radiating segments 211-214 cannot function as a grounding portion.

Furthermore, in Dai et al., the radiating segments 211-218 is partially superposed with the radiating segments 211-214, rather than surrounding the radiating segments 211-214.

Additionally, maybe the examiner considers the radiating portion 21 (211-218) as the first conductive patch operating at a first frequency band and the ground portion 10 as the second conductive patch operating at a second frequency band. However, the ground portion 10 in Dai et al. cannot radiate a useful signal (either the wanted higher or lower frequency band signal). So the consideration is incorrect.

In conclusion, as claimed in claim 6, when one of the first and the second conductive patches resonates, the other one of them functions as a grounding portion for the resonance one. The antenna, due to the specific grounding characteristic thereof, has a simple structure and a low profile, without an additional grounding portion.

The antenna as claimed in claim 6 is so discriminative from Dai et al. One having ordinary skills can **NOT** obtain the antenna as claimed in claim 6 from Dai et al.

Therefore, independent claim 6 is believed to be patentable over Dai et al.

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Claims 7-13 are also believed to be patentable due to their directly or indirectly dependency from claim 6.

Regarding independent claim 14, an antenna comprises a substrate defining a lengthwise edge and a lateral edge, a conductive element formed on the substrate, and a coaxial cable. The conductive element includes **a small first radiating patch and a large radiating patch separated from each other by a generally L-shaped gap**, said gap being equipped with thereof two opposite ends terminating at said lengthwise edge and said lateral edge, respectively. The cable is located around the lateral edge.

Obviously, the examiner interprets the radiating portion 21 of Dai et al. is the small radiating patch and the ground portion 10 is the large radiating patch, which are separated from each other by a generally L-shaped gap (not labeled). The applicants believe this interpretation is incorrect because the ground portion 10 cannot be called a "radiating patch" because of the reason stated above.

Furthermore, the substrate as defined in claim 14 has a rectangular shape with perpendicular lengthwise and lateral edges. The gap as defined in claim 14 has opposite two opening ends. **One is terminated at the lengthwise edge of the substrate and the other is terminated at the lateral edge of the substrate.** This design is to divide the conductive element into separate large and small radiating parts. But differently in Dai et al., the gap defined by the examiner has only one opening end terminated at a lengthwise edge of the substrate 30. The other end of the gap is a closed end, adjacent to which the radiating portion 21 and the ground portion 10 are connected with one another. The gap in Dai et al. has absolutely different meanings from that of the applicants' present invention. Additionally, in Dai the cable is located around the lengthwise edge rather than the lateral edge.

One having ordinary skills can NOT obtain the antenna as claimed in claim

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14 through defining an **L-shaped** through gap extending from a lengthwise edge to a lateral edge to divide the conductive element into separate two parts.

Therefore, independent claim 14 is believed to be patentable over Dai et al.

Claims 15-16 are also believed to be patentable due to their dependency at least from claim 14.

In view of the above claim amendments and remarks, the subject application is believed to be in a condition for allowance and an action to such effect is earnestly solicited.

Respectfully submitted,  
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